```
[illegible] 14: [illegible]:54 User[illegible]67149 Session D[illegible]1.1

[illegible]: [illegible] - [illegible]IALOG OneSearch
  File   2:INSPEC  1969-2003/Jul W2
         (c) 2003 Institution of Electrical Engineers
*File   2: Alert feature enhanced for multiple files, duplicates
removal, customized scheduling. See HELP ALERT.
  File   6:NTIS  1964-2003/Jul W4
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*File   6: Alert feature enhanced for multiple files, duplicates
removal, customized scheduling. See HELP ALERT.
  File   8:Ei Compendex(R)  1970-2003/Jul W2
         (c) 2003 Elsevier Eng. Info. Inc.
*File   8: Alert feature enhanced for multiple files, duplicates
removal, customized scheduling. See HELP ALERT.
  File  34:SciSearch(R) Cited Ref Sci  1990-2003/Jul W3
         (c) 2003 Inst for Sci Info
  File 434:SciSearch(R) Cited Ref Sci  1974-1989/Dec
         (c) 1998 Inst for Sci Info
  File  35:Dissertation Abs Online  1861-2003/Jun
         (c) 2003 ProQuest Info&Learning
  File  65:Inside Conferences  1993-2003/Jul W3
         (c) 2003 BLDSC all rts. reserv.
  File  94:JICST-EPlus  1985-2003/Jul W2
         (c)2003 Japan Science and Tech Corp(JST)
  File  99:Wilson Appl. Sci & Tech Abs  1983-2003/Jun
         (c) 2003 The HW Wilson Co.
  File 144:Pascal  1973-2003/Jul W2
         (c) 2003 INIST/CNRS
  File 305:Analytical Abstracts  1980-2003/Jun W5
         (c) 2003 Royal Soc Chemistry
*File 305: Alert feature enhanced for multiple files, duplicate
removal, customized scheduling.  See HELP ALERT.
  File 315:ChemEng & Biotec Abs  1970-2003/Jun
         (c) 2003 DECHEMA
  File 35[illegible]:Derwent WPIX  1963-2003/UD,UM &UP=200347
         (c) 2003  Thomson Derwent
  File 347:JAPIO  Oct 1976-2003/Mar Updated 030703
         (c) 2003 JPO & JAPIO
*File 347: JAPIO data problems with year 2000 records are now fixed.
Alerts have been run.  See HELP NEWS 347 for details.
  File 344:Chinese Patents Abs  Aug 1985-2003/Mar
         (c) 2003 European Patent Office
  File [illegible]:[illegible] Patents  1961-[illegible]/BOPI [illegible]
         (c) [illegible] INPI. All rts. reserv.
*File [illegible]: This file is not currently updating. The last update is [illegible].
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Set	Items	Description
S1	[illegible]	NANOTUBE? ? OR NANO()TUBE? ? OR NANOFILAMENT?? OR NANO()FILAMENT?? OR NANOFIBRE? ? OR NANO()FIBRE? ? OR NANOFIBER?? OR NANO()FIBER? ? OR NANOFIBRIL? ? OR NANO()FIBRIL? ? OR FULLERENE
S2	29892	CARBON(3N)(NANOTUBE? ? OR NANO()TUBE? ?)
S3	67263	S1:S2
S4	120996	UNIFORM??????(3N)(LAYER? OR MATERIAL? OR FILM? ? OR COAT???? OR DIAMOND? ?)
S5	67137	(DIAMOND? ? OR DIAMOND? ?()LIKE)(3N)(LAYER? OR MATERIAL? OR FILM? ? OR COAT???? OR CARBON)
S6	186676	S4:S5
S7	29648	THICK??????(3N)RANG?????
S8	[illegible]	(MIL OR MICRON? ? OR ANGSTROM? ? OR NANOMETER? ? OR NM)(3N)(THICK?????? OR SIZE?? OR DIMENSION???)
S9	414756	S7:S8
S10	26608	FIELD? ?(3N)(EMIT?????? OR CATHODE? ?)
S11	8273	EMIT??????(3N)CATHODE? ?
S12	32941	S10:S11
S13	25485	(PREVENT? OR AVOID? OR PRECLUD? OR PROHIBIT? OR REDUC? OR ELIMINAT?)(3N)(EVAPORAT??????? OR VAPOR??????)
S14	[illegible]	CARBON(3N)(EVAPORAT??????? OR VAPOR??????)
S15	[illegible]	S13:S14
S16	[illegible]	S3 AND S6
S17	137	S16 AND S9
S18	7	S17 AND S12
S19	7	RD (unique items)
S20	130	S17 NOT S18
S21	5	S20 AND S15
S22	5	RD (unique items)
S23	125	S20 NOT S21
S24	125	S23 AND S1
S25	95	S24 AND S2
S26	95	S25 AND S3
S27	95	S26 AND S6
S28	19	S27 AND S4
S29	[illegible]	S28 AND S5
S30	[illegible]	RD S27 (unique items)
S31	5	S30 AND S7
S32	5	RD (unique items)
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	0	S33 AND S13
[illegible]	[illegible]	S33 AND S14
S39	1826	S1 AND S8
S40	29	S39 AND S4
S41	29	S40 AND S3
S42	19	RD (unique items)
S43	15	S42 NOT S32,S22,S19

19/3,AB/1 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

11286843 Genuine Article#: 639KA Number of References: 380
Title: Carbon nanostructures (ABSTRACT AVAILABLE)
Author(s): Shenderova OA (REPRINT) ; Zhirnov VV; Brenner DW
Corporate Source: N Carolina State Univ,Raleigh//NC/27695 (REPRINT); N Carolina State Univ,Raleigh//NC/27695; Int Technol Ctr,Res Triangle Pk//NC/; Semicond Res Corp,Res Triangle Pk//NC/
Journal: CRITICAL REVIEWS IN SOLID STATE AND MATERIALS SCIENCES, 2002, V27, N3-4, P227-356
ISSN: 1040-8436 Publication date: 20020000
Publisher: CRC PRESS LLC, 2000 CORPORATE BLVD NW, JOURNALS CUSTOMER SERVICE, BOCA RATON, FL 33431 USA
Language: English Document Type: REVIEW
Abstract: An overview of the various carbon structures with characteristic sizes in the nanoscale region is presented, with special attention devoted to the structures and properties of 'nanodiamond' and **carbon nanotubes**. The term 'nanodiamond' is used broadly for a variety of **diamond** based **materials** at the nanoscale ranging from single diamond clusters to bulk nanocrystalline films. Only selected properties of **carbon nanotubes** are discussed, with an aim to summarize the most recent discoveries. Current and potential applications of carbon nanostructures are critically analyzed.

4261659 Genuine Article#: 384HB Number of References: 39
Title: Enhancement in field emission of silicon microtips by bias-assisted carburization (ABSTRACT AVAILABLE)
Author(s): Kichambare PD; Tarntair FG; Chen LC (REPRINT) ; Chen KH; Cheng HC
Corporate Source: Natl Taiwan Univ,Ctr Condensed Matter Sci,Taipei 106//Taiwan/ (REPRINT); Natl Taiwan Univ,Ctr Condensed Matter Sci,Taipei 106//Taiwan/; Natl Chiao Tung Univ,Dept Elect Engn,Hsinchu 30050//Taiwan/; Natl Chiao Tung Univ,Inst Elect,Hsinchu 30050//Taiwan/; Acad Sinica,Inst Atom & Mol Sci,Taipei 115//Taiwan/
Journal: JOURNAL OF VACUUM SCIENCE & TECHNOLOGY B, 2000, V18, N6 (NOV-DEC), P2722-2729
ISSN: 1071-1023 Publication date: 20001100
Publisher: AMER INST PHYSICS, 2 HUNTINGTON QUADRANGLE, STE 1NO1, MELVILLE, NY 11747-4501 USA
Language: English Document Type: ARTICLE
Abstract: Ultrathin carbon layers with **thicknesses** below 50 **Angstrom** have been deposited on silicon microtip arrays by bias-assisted carburization (BAC) using microwave plasma chemical vapor deposition. The tip radius of these silicon tips is reduced below 55 nm under low deposition temperature. The field emission characterization has been performed in a high-vacuum environment. An enhancement in the field emission is observed of about 3 orders of magnitude in BAC silicon microtips over untreated silicon microtips. With an applied voltage of 1100 V, emission currents of 60 and 120 muA have been achieved for the films grown (at dc bias of -200 V for 40 min) with 15% and 25% CH4/H-2 gas ratio, respectively. An emission current of 40 muA has been achieved for the film grown (at dc bias of -300 V for 30 min) with 3.5% CH4/H-2 ratio. The BAC silicon emitter has good emission stability at a constant voltage of 1100 V. These investigations indicate that further improvement of this technology will lead to simple and inexpensive field emission display devices. (C) 2000 American Vacuum Society. [S0734-211X(00)10706-1].

14/5,AB/3 (Item 3 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

05192914 Genuine Article#: VF929 Number of References: 36
Title: SELF-DIFFUSION AND DYNAMIC BEHAVIOR OF ATOMS AT STEP EDGES OF IRIDIUM SURFACES (Abstract Available)
Author(s): FU TY; TZENG YR; TSONG TT
Corporate Source: ACAD SINICA,INST PHYS/TAIPEI 11529//TAIWAN/; ACAD SINICA,INST PHYS/TAIPEI 11529//TAIWAN/; NATL TAIWAN NORMAL UNIV,DEPT PHYS/TAIPEI 117//TAIWAN/
Journal: PHYSICAL REVIEW B-CONDENSED MATTER, 1996, V54, N8 (AUG 15), P 5932-5939
ISSN: 0163-1829
Language: ENGLISH Document Type: ARTICLE

Abstract: Steps are an integral part of a surface. Many surface phenomena are to a very large extent affected or determined by the existence of lattice steps. We report a study of the dynamic behavior of atoms at step edges and on stepped surfaces of iridium. Diffusion of edge atoms along steps of different atomic structures, detachment or dissociation of step-edge atoms, descending and ascending motions of atoms at step edges, the upward movement of in-layer atoms, and the stable structure of **nanometer-size** islands have been investigated, and the activation barrier heights of various atomic processes at lattice steps have been derived. We have also derived parameters of adatom diffusion on the terrace of the Ir(113) and (331) surfaces to compare with those of ledge-atom diffusion along step edges of the Ir(111). Possible implications of the behavior of atoms at lattice steps in thin-film epitaxy are also discussed.

??/?,AB/4 (Item 1 from file: 350)
DIALOG(R)File 350:Dervent WPIX

???3397
WPI Acc No: 2003-213914/200321
XRAM Acc No: C03-054801
XRPX Acc No: N03-170619
Minute particle dispersion used in electron-emitting element, contains microparticle dispersed in organic solvent which contains at least dipolar non-proton solvent
Patent Assignee: MATSUSHITA DENKI SANGYO KK (MATU)
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
JP 2002255528	A	20020911	JP 2001283301	A	20010918	200321	B

Priority Applications (No Type Date): JP 2000281846 A 20000918
Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
JP 2002255528	A	14	C01B-031/02	

Abstract (Basic): JP 2002255528 A
Abstract (Basic):
NOVELTY - A minute particle dispersion contains a microparticle dispersed in an organic solvent which contains at least a dipolar non-proton solvent.
DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:
(1) Manufacture of minute particle dispersion which involves dispersing microparticle by making microparticle to transfer in the organic solvent containing at least dipolar non-proton solvent;
(2) Purification of microparticle which involves forming a mixture containing microparticle dispersed in the organic solvent containing at least dipolar non-proton solvent, classifying and extracting microparticle from the dispersion;
(3) Ink for inkjets contains the minute particle dispersion;
(4) Formation of skin layer of microparticle which involves coating the minute particle dispersion on a support and volatilizing and drying the organic solvent to form skin layer of microparticle on the support;

(5) An electron-emitting element (100) which has an electroconductive component (I) (102) provided on a support (101), an electron-emission component (103) having skin layer of microparticle provided on the electroconductive component (I) and an electroconductive component (II) (105) by which a bias is performed with respect to the electroconductive component (I);
(6) A plane-light-emitting device which has the electron-emitting element and a fluorescent material is provided on the electroconductive component (II) of the electron-emitting element;
(7) An image display device which has 1 or more electron-emitting elements. A fluorescent material is provided on the electroconductive component (II) of the electron-emitting element. An image is displayed by the electron released from electron-emitting elements;
(8) A gas discharge panel which has a fluorescent layer formed by coating a liquid which dispersed the fluorescent-material microparticle in the organic solvent containing the dipolar non-polar solvent, or

pair of glass substrates. Ultraviolet rays produced in the discharge space in the glass substrates, are irradiated to the fluorescent layer. The gas discharge panel transforms into visible light and displays an image; and

(9) A solid vacuum device which has an electroconductive component (I) provided on a support, an electron-emission component having skin layer of microparticle provided on the electroconductive component (I) and an electroconductive component (II) by which a bias is performed with respect to the electroconductive component (I) arranged in a vacuum vessel.

USE - Used in ink for inkjets, electron-emitting element, plane-light-emitting element, image display device, gas discharge panel and solid vacuum device (all claimed) and also used in electron devices such as transistor and diode, secondary batteries, plasma display panel, liquid-crystal display device and hydrogen storage device.

ADVANTAGE - Since the microparticle has small grain size, the microparticle is dispersed uniformly in the minute particle dispersion. The minute particle dispersion is produced efficiently and has high purity. By using the minute particle dispersion, **uniform** microparticle skin **layer** is formed easily on the support at low operating voltage. The economical electron-emitting element, plane-light emitting element, image display device, gas discharge panel, solid vacuum device, plasma display panel and liquid-crystal display device having the minute particle dispersion, have excellent stability, uniformity and high yield.

DESCRIPTION OF DRAWING(S) - The figure shows the electron-**emitting** element and **field**-emission-type plane-light-emitting element using the electron-emitting element.

Electron-emitting element (100)
Support (101)
Electroconductive component (I) (102)
Electron-emission component (103)
Electroconductive component (II) (105)
pp; 19 DwgNo 1/6

17/9,AB/2 (Item 2 from file: 350)
DIALOG(R)File 350:Derwent WPIX

014860394
WPI Acc No: 2002-681100/200273
XRAM Acc No: C02-192138
XRPX Acc No: N02-537580
Planar field emission color lamp for illuminating flat panel display, comprises field emission light source of **nanotube** emitters that are arranged in serpentine shape
Patent Assignee: IND TECHNOLOGY RES INST (INTE-N)
Inventor: CHUNG F; TSAI K; WANG W
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 6426590	B1	20020730	US 2000482583	A	20000113	200273	B

Priority Applications (No Type Date): US 2000482583 A 20000113
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 6426590	B1		14	H01J-001/62	

Abstract (Basic): US 6426590 B1
Abstract (Basic):
NOVELTY - A planar field emission color lamp comprises a field emission light source of **nanotube** emitters that are arranged in serpentine shape.
DETAILED DESCRIPTION - A planar field emission color lamp with **nanotube** emitters comprises:
(i) a lamp body having an electrically insulating cover plate (44), an electrically insulating base plate, two sidewalls and two end walls forming a sealed cavity (50);
(ii) three spaced-apart, serpentine-shaped emitter stack(s) (54) formed on the base plate, each being positioned parallel to the two end walls and comprises a layer (48) of a first electrically conductive material and a layer of **nanotube** emitter (52) on top;
(iii) a layer of a second electrically material on a surface of the electrically insulating cover plate facing the cavity;
(iv) three spaced-apart, serpentine-shaped fluorescent coating strips (46) on the layer of second electrically conductive material corresponding in a mirror image relationship to the three emitter stack(s) when the cover plate is positioned over the base plate (42) forming the lamp body; and
(v) electrically insulating spacers in between the cover plate and the base plate for maintaining its present spacing.
Each of the three fluorescent coating strips is adapted for emitting a red, green or blue light upon activation by electrons emitted from the three emitter stacks.
USE - For illuminating flat panel display, e.g. as backlight source for liquid crystal display (LCD).
ADVANTAGE - The color lamp does not require the production of complicated microtip electron emitters. The conventional color filters normally required is completely eliminated. The lamp combines the desirable functions of a backlight and color filters into one convenient package which can be produced by thick film printing techniques for forming the **nanotube** emitter stacks. High quality

color illumination for the flat panel display units can thus be achieved at low production cost.

DESCRIPTION OF DRAWING(S) - The figure shows a partial, perspective view of the lamp with a diode structure.

Base plate (42)
Cover plate (44)
Silver paste layer (46)
ITO layer (48)
Cavity (50)
Nanotube emitter layer (52)
Emitter stack (54)
pp; 14 DwgNo 3/10

??/3,AB/? (Item ? from file: 350)
DIALOG(R)File 350:Derwent WPIX

014086370
WPI Acc No: 2001-570584/200164
XRAM Acc No: C01-169517
XRPX Acc No: N01-425203

Nanotube used in electron **field emitters**, e.g. flat panel displays, cathode ray tubes, has specified thickness of **uniform coating** of **diamond** or **diamond-like carbon**

F-Y-

Patent Assignee: FULLERENE INT CORP (FULL-N)
Inventor: DIMITRIJEVIC S; LOUTFY R O; WITHERS J C
Number of Countries: 095 Number of Patents: 005
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 200161719	A1	20010823	WO 2001US5029	A	20010216	200164	B
US 20010024078	A1	20010927	US 2000182834	P	20000216	200164	
			US 2001784910	A	20010216		
AU 200137064	A	20010827	AU 200137064	A	20010216	200176	
EP 1256124	A1	20021113	EP 2001909091	A	20010216	200282	
			WO 2001US5029	A	20010216		
KR 2002087401	A	20021122	KR 2002710712	A	20020816	200320	

Priority Applications (No Type Date): US 2000182834 P 20000216; US 2001784910 A 20010216

Patent Details:
Patent No Kind Lan Pg Main IPC Filing Notes
WO 200161719 A1 E ? H01J-001/304
Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW
US 20010024078 A1 H01J-001/15 Provisional application US 2000182834

AU 200137064 A H01J-001/304 Based on patent WO 200161719
EP 1256124 A1 E H01J-001/304 Based on patent WO 200161719
Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LV LU MC MK NL PT RO SE SI TR
KR 2002087401 A H01J-001/?

Abstract (Basic): WO 200161719 A1
Abstract (Basic):

NOVELTY - A **nanotube** has a **uniform coating** of **diamond** or **diamond-like carbon**, in which the coating is 10-100 **nm thick**.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:

(A) a **field** emission **cathode** in an electron **field emitter** comprising a substrate, **nanotubes** coating the substrate, and a **uniform coating** of **diamond** or **diamond-like carbon** on the **nanotubes**, in which the **diamond** and **diamond-like carbon** has a negative electron affinity which retards the evaporation of **carbon** from the **nanotubes** when the cathode is utilized in electron field emission;

(B) a method of enhancing the electron field emission from an electron **field emitter** having a **cathode** consisting of **nanotubes coating** a substrate, comprising **uniformly coating** the **nanotube** with an enhancing field emission effective amount of either **diamond** or **diamond-like carbon**; and

(C) a method for retarding the evaporation of carbon from an electron **field emitter**.

USE - Used in electron **field emitters**, e.g. flat panel displays, cathode ray tube (CRT), and multiple CRT displays.

ADVANTAGE - The **nanotubes** have enhanced electron emission characteristics, and retard and prevent the evaporation of **carbon** from **carbon nanotubes** during operation.

pp; 47 DwgNo 0/8

[illegible]/5,AB/[illegible] (Item 1 from file: 347)
DIALOG(R)File 347:JAPIO

[illegible]

FIELD EMITTER

PUB. NO.: 2002-203471 [JP 2002203471 A]
PUBLISHED: July 19, 2002 (20020719)
INVENTOR(s): JISUUN IIMU
APPLICANT(s): JISUUN IIMU
APPL. NO.: 2001-190659 [JP 20011190659]
FILED: June 25, 2001 (20010625)
PRIORITY: 00 200078822 [KR 200078822], KR (Korea) Republic of, December 19, 2000 (20001219)

ABSTRACT

PROBLEM TO BE SOLVED: To provide a **field emitter** based on a **carbon nano-tube** capable of improving operation of a field emission display device.

SOLUTION: The **carbon nano-tube** 10 is covered with a high-hardness semiconductor layer or insulation layer 12. The semiconductor layer or insulation layer 12 is doped as an n-type, and has a **thickness** within several **nanometers** (**nm**) and excellent stability against collision from an external atom or particle normally [illegible] . A kind of compound of B, C and N including BN, GaN, Si3N4, TiC, B4C and the like, some kinds of oxides including TiO2, Al2O3, MgO and the like and some dielectrics including SrTiO3 and the like can be used for it, and **diamond-like carbon** (DLC) or **diamond** particles can be used as well.

22/3,AB/1 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

10927419 Genuine Article#: 585ET Number of References: 20
Title: Effect of catalytic layer thickness on growth and field emission characteristics of **carbon nanotubes** synthesized at low temperatures using thermal chemical vapor deposition (ABSTRACT AVAILABLE)
Author(s): Park YJ (REPRINT) ; Han IT; Kim HJ; Woo YS; Lee NS; Jin YW; Jung JE; Choi JH; Jung DS; Park GY; Kim JM
Corporate Source: Samsung Adv Inst Technol,FED Project,POB 111/Suwon 440600//South Korea/ (REPRINT); Samsung Adv Inst Technol,FED Project,Suwon 440600//South Korea/; Sung Kyun Kwan Univ,Dept Vacuum Sci & Technol,Suwon 440746//South Korea/; Seoul Natl Univ,Dept Chem,Seoul 151742//South Korea/; Sejong Univ,Dept Adv Mat Engn,Seoul 143747//South Korea/; Sung Kyun Kwan Univ,Dept Mat Engn,Suwon 440746//South Korea/
Journal: JAPANESE JOURNAL OF APPLIED PHYSICS PART 1-REGULAR PAPERS SHORT NOTES & REVIEW PAPERS, 2002, V41, N7A (JUL), P4679-4685
ISSN: 0021-4922 Publication date: 20020700
Publisher: INST PURE APPLIED PHYSICS, DAINI TOYOKAIJI BLDG, 4-24-8 SHINBASHI, MINATO-KU TOKYO, 105-0004, JAPAN
Language: English Document Type: ARTICLE
Abstract: The direct synthesis of **carbon nanotubes** (CNTs) on substrates by chemical vapor deposition (CVD) is a highly promising route for their application to field emission displays. Several stringent requirements have to be met for this purpose, including low-temperature growth below 600 degreesC to utilize glass substrates and large-area deposition for practical use. In this study, we carried out the synthesis of CNTs by thermal CVD on glass substrates at temperatures as low as 500-550 degreesC. CNTs were grown by thermal decomposition of CO and H-2 gases at atmospheric pressure for different thicknesses of Invar (Fe-Ni-Co alloy) catalytic layers. The CNT growth was strongly correlated with the preparation conditions of the catalytic layers. The diameters and heights of as-grown CNTs increased with the catalytic layer **thickness** from 2 **nm** to 30 nm. Measurements of the field emission properties of the CNTs showed that the threshold electric fields decreased with increasing thickness of the catalytic **layers. Uniform** electron emission was observed over a large area of 150 x 150 mm(2) with high emission current and high brightness.

15667267 PASCAL No.: 02-0373489

High pressure diamond and diamond-like carbon deposition using a microwave CAP reactor

Diamond 2001 : Proceedings of the 12th European Conference on **Diamond**, Dia mond-like **Materials**, **Carbon Nanotubes**, Nitrides & Silicon Carbide

MCCONNELL M L; DOWLING D P; POPE C; DONNELLY K; RYDER A G; O'CONNOR G M
ROBERTSON John, ed; KAWARADA Hiroshi, ed; KOHN Erhard, ed; SITAR Zlatko, ed
Surface Engineering Group, Materials Technology Department, Enterprise Ireland, Glasnevin, Dublin, Ireland; National Centre for Laser Applications, NUI, Galway, Ireland

Diamond 2001: European conference on Diamond, Diamond-like Materials, Carbon Nanotubes, Nitrides and Silicon Carbide, 12 (Budapest HUN) 2001-09-02
Journal: Diamond and related materials, 2002, 11 (3-6) 1036-1040
Language: English

This paper describes the deposition of **diamond** and **diamond-like carbon coatings** using the Circumferential Antenna Plasma (CAP) reactor. Carbon coatings were deposited at pressures of 8000, 5000 and 3300 Pa onto silicon wafers. The coatings were characterised using electron microscopy and Raman spectroscopy as a function of distance from the centre of the substrate holder. At 8000 Pa, **diamond coatings** were deposited up to 20 mm from the centre of the silicon wafer, while under the same deposition conditions, **diamond-like carbon** was observed in an annular region between 62 and 75 mm from the centre. At a deposition pressure of 5500 Pa, homogeneous free-standing **diamond films**, 120 **mu** m **thick** and 50 mm in diameter were deposited.

22/3,AB/3 (Item 2 from file: 144)
DIALOG(R)File 144:Pascal

15648408 PASCAL No.: 02-0353856
A novel CW laser-powder method of **carbon** single-wall **nanotubes** production
Diamond 2001 : Proceedings of the 12th European Conference on **Diamond**, Dia mond-like **Materials**, **Carbon Nanotubes**, Nitrides & Silicon Carbide
BOLSHAKOV A P; UGLOV S A; SAVELIEV A V; KONOV V I; GORBUNOV A A; POMPE W; GRAFF A
ROBERTSON John, ed; KAWARADA Hiroshi, ed; KOHN Erhard, ed; SITAR Zlatko, ed
Natural Sciences Center of General Physics Institute, Bldg. L-2', Vavilov str. 38, 119991 Moscow, Russia; Institute of Materials Science, Dresden University of Technology, 01062 Dresden, Germany; Institute for Solid State and Materials Research (IWF), 01171 Dresden, Germany
Diamond 2001: European conference on Diamond, Diamond-like Materials, Carbon Nanotubes, Nitrides and Silicon Carbide, 12 (Budapest HUN) 2001-09-02
Journal: Diamond and related materials, 2002, 11 (3-6) 927-930
Language: English
A novel continuous high productive laser-powder method of **carbon** single-wall **nanotube** (SWNT) synthesis based on the laser ablation of mixed graphite and metallic catalysts (Ni/Co = 1:1) powders by a 1-kW continuous wave CO SUB 2 laser in an argon or nitrogen stream has been proposed. Thermal conductive losses of the laser power introduced in **micron-size** particles were significantly decreased compared to laser heating of the bulk solid targets in known laser techniques. As a result, more effective utilization of the absorbed laser power for material **evaporation** was achieved. The **carbon** soot yield obtained was 5 g/h. Preliminary tests have revealed a SWNT abundance in the soot of 20-40 with a mean diameter of 1.2-1.3 nm as established by Raman spectroscopy and HRTEM. Approaches for the enrichment of the soot with **nanotubes** are considered.

22/3,AB/4 (Item 3 from file: 144)
DIALOG(R)File 144:Pascal

15272090 PASCAL No.: 01-0442238
Observation of **carbon nanotubes** synthesized on various substrates using metal-phthalocyanine
ICSM 2000. Part III
KATAYAMA T; ARAKI H; KAJII H; YOSHINO K
NEUGEBAUER Helmut, ed; SARICIFTCI N Serdar, ed; KUZMANY Hans, ed; RESEL Roland, ed; LEISING Guenther, ed
Department of Electronic Engineering, Graduate School of Engineering. Osaka University, 2-1 Yamada-Oka, Osaka 565-0871, Japan
International Conference on Science and Technology of Synthetic Metals (Gastein AUT) 2000-07-15
Journal: Synthetic metals, 2001, 121 (1-3) 1235-1236
Language: English
Multiwalled **carbon nanotubes** (MWNT) were synthesized on various substrates by vacuum chemical vapour deposition at 700-750 Degree C C using (Co, Ni, Fe)-phthalocyanines (Pcs) as source materials. Intense growth was observed on a quartz plate with a low surface tension and an oxidized surface of an Al plate. **Nanotubes** grew only at the micro-defects of Ni, Fe and stainless foils and only at uneven sites of Ta and W foils. No growth was observed on a smooth area of Ta and W foils with large surface tensions. When vapours of these metals impinge onto the substrate from the vapour phase, they may aggregate to a **nanometer-sized** particle with a high contact angle against the substrate because of their hard wetting, and nucleation of MWNTs may occur on the particle. We also performed CVD synthesis of MWNTs in a H SUB 2 /Ar gas flow. When FePc was used as source **material**, **uniformly** aligned **nanotubes** grew at the edges of a quartz plate and the inner wall of a quartz tube,.

[illegible]/3,AB/5 (Item 1 from file: 350)
DIALOG(R)File 350:Derwent WPIX

013342874
WPI Acc No: 2000-514813/200046
XRAM Acc No: C00-153601

Composite material for chemiresistors, are formed by depositing non-electrically-conductive polymer and particles of electrically conducting material on a substrate by e.g. pulsed laser deposition

Patent Assignee: US SEC OF NAVY (USNA)
Inventor: CHRISEY D B; MCGILL R A; PIQUE A
Number of Countries: 023 Number of Patents: 002
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 200044822	A2	20000818	WO 2000US1650	A	20000127	200046	B
AU 200025149	A	20000818	AU 200025149	A	20000127	200057	

Priority Applications (No Type Date): US 99117467 P 19990127
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 200044822	A2	E	20	C08K-003/00	
					Designated States (National): AU CA JP KR MX
					Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
AU 200025149	A			C08K-003/00	Based on patent WO 200044822

Abstract (Basic): WO 200044822 A2
Abstract (Basic):

NOVELTY - Providing a coating of composite material such that electrically conducting particles are dispersed homogeneously throughout the non-electrically conductive polymer.

DETAILED DESCRIPTION - A composite material comprising electrically conducting polymer particles of an electrically conducting material dispersed throughout non-electrically conductive polymer deposited on a substrate, is formed by depositing the non-electrically-conductive polymer and particles of electrically conducting material on a substrate by pulsed laser deposition, matrix-assisted pulsed laser evaporation or matrix-assisted laser evaporation direct write.

INDEPENDENT CLAIMS are also included for:

(1) creating a layer of composite material on a receiving substrate comprises:

(a) providing a source of laser energy;

(b) providing a receiving substrate;

(c) providing a target comprising a mixture of a non-electrically-conductive polymer and particles of an electrically conductive material dispersed throughout the non-electrically conductive polymer;

(d) exposing the target to the sources of laser energy so that the laser strikes the target and causes a portion of the mixture of a non-electrically conductive material to desorb and be lifted from the target, the target and the receiving substrate being orientated w.r.t. each other such that the mixture of a non-electrically conductive polymer and particles of an electrically conductive material are transferred onto the receiving substrate, thereby forming a layer of the composite material;

(2) creating a composite material on a receiving substrate as above

where the target is a rotatable target and comprises first and second segments, and (d) comprises rotating while exposing the target to sources;

(3) a method as in (1), further comprising step (e), where the first and second targets are exposed individually to first and second laser sources such that the laser energies of the first and second targets causes a portion of the electrically (non)conductive material to separate from the target;

(4) the method as in (1), where the matrix material volatiles; and

(5) the method as in (1), where the first and second matrices consist respectively of non-electrically conductive polymer and electrically conductive material.

USE - Used for chemiresistors.

ADVANTAGE - The thickness, uniformity, homogeneity, location and surface coverage of the coating are precisely controlled.

DESCRIPTION OF DRAWING(S) - Figure 1 is a schematic representation of the method for creating a composite layer by pulsed laser deposition.

apparatus for carrying out claimed method (100)
vacuum chamber (10)
laser (12)
lens (14)
target (16)
rotating arm (18)
plume (20)
substrate (22)
substrate holder (24)
quartz lamp (26)
thermocouple (28)
gas inlet port (30)
direction of gas flow (31)
bubbler (32)
nitrogen or argon (50)
mask (34
pp; 20 DwgNo 1/6

32/3,AB/1 (Item 1 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

05982173
E.I. No: EIP01566811519
Title: Fabrication and electron field emission properties of **carbon nanotube** films by electrophoretic deposition
Author: Gao, B.; Yue, G.Z.; Qiu, Q.; Cheng, Y.; Shimoda, H.; Fleming, L.; Zhou, O.
Corporate Source: Applied Nanotechnologies, Inc., Chapel Hill, NC 27514, United States
Source: Advanced Materials v 13 n 23 Dec 3 2001. p 1770-1773+1740
Publication Year: 2001
CODEN: ADVMEW ISSN: 0935-9648
Language: English
Abstract: **Uniform carbon nanotube films** can be readily formed by electrophoretic deposition, as is presented in this communication. By varying deposition current and time, films with **thicknesses** in the **range** between several tens of nanometers and a few micrometers can be fabricated. The macroscopic **nanotube** films also show excellent electron field emission characteristics. 17 Refs.

32/3,AB/2 (Item 1 from file: 144)
DIALOG(R) File 144:Pascal

15631957 PASCAL No.: 02-0357644
Evaluation of corrosion performance of ultra-thin Si-DLC overcoats with electrochemical impedance spectroscopy
Diamond 2001 : Proceedings of the 12th European Conference on **Diamond**, Diamond-like **Materials**, **Carbon Nanotubes**, Nitrides & Silicon Carbide
PAPAKONSTANTINOU P; ZHAO J F; RICHARDOT A; MCADAMS E T; MCLAUGHLIN J A
ROBERTSON John, ed; KAWARADA Hiroshi, ed; KOHN Erhard, ed; SITAR Zlatko, ed
NIBEC, School of Electrical and Mechanical Engineering, University of Ulster at Jordanstown, Shore Road, Newtownabbey, Antrim BT37 0QB, United Kingdom
Diamond 2001: European conference on Diamond, Diamond-like Materials, Carbon Nanotubes, Nitrides and Silicon Carbide, 12 (Budapest HUN) 2001-09-02
Journal: Diamond and related materials, 2002, 11 (3-6) 1124-1129
Language: English
Diamond-like carbon (DLC) incorporating 3.6 at.% Si and with **thickness ranging** from 2 to 100 nm were deposited on conducting Al SUB 2 O SUB 3 -TiC substrate by means of the PECVD technique. Electrochemical behaviour has been studied in 2 M HCl solution using AC impedance and polarisation measurements. The electrochemical impedance (EI) spectra were analysed in the context of an equivalent circuit model, which incorporated two times constants representing the Si-DLC coating and the corrosion reaction occurring at electrolyte Al SUB 2 O SUB 3 -TiC interface. However, 5 and 11 **nm thick** films displayed three phase constants suggesting the existence of interlayers, density gradients and inhomogeneities in the films. Results indicate that ultrathin films in the range 2-11 nm provide barrier properties, evidenced by increases of one order of magnitude relative to the substrate in the charge transfer resistance, which is a measure of the rate of electrochemical reactions occurring at the electrolyte/substrate interface. After the potentiodynamic scan, films **thicker** than 20 **nm** remained intact while their thinner counterparts exhibited a severely pitted surface. Pitting occurred preferentially in the TiC sites. The corrosion resistance of the ultrathin films increased substantially with immersion time in the electrolyte solution due to the filling of pores with a passivating material, thus stopping access of the electrolyte to the substrate.

32/3,AB/3 (Item 2 from file: 144)
DIALOG(R)File 144:Pascal

15297589 PASCAL No.: 01-0470582
CVD diamond for radiation detection devices
Proceedings of Diamond 2000, the 11th European Conference on **Diamond, Diamond-like Materials, Carbon Nanotubes,** Nitrides and Silicon Carbide

BERGONZO P; BRAMBILLA A; TROMSON D; MER C; GUIZARD B; FOULON F; AMOSOV V
ROBERTSON John, ed; KAWARADA Hiroshi, ed; KOHN Erhard, ed; SITAR Zlatko, ed
LETI (CEA-Technologies Avancees) DEIN/SPE, CEA/Saclay, 91191 Gif-sur-Yvette, France; TRINITI, Division of Physics of Thermonuclear Reactors, Troitsk Moscow reg. 142092, Russia

European Conference on Diamond, Diamond-like Materials, Carbon Nanotubes, Nitrides and Silicon Carbide (Diamond 2000), 11 (Porto PRT) 2000-09-03
Journal: Diamond and related materials, 2001, 10 (3-7) 631-638
Language: English

CVD **diamond** is a remarkable **material** for the fabrication of radiation detectors. Radiation hardness, chemical resistance and high temperature operation capabilities of diamond explain its use in the fabrication of devices operating in hostile environments such as that encountered in the nuclear industry and in high energy physics. For this purpose, we have investigated the growth of high quality chemically vapour deposited (CVD) polycrystalline diamond as well as specific material and device processing. CVD **diamond films** were grown using the microwave plasma enhanced technique. Deposition processes were optimised according to the application requirements. This includes the synthesis of films with high sensitivity, with weak optical absorption in the UV-VIS domain or with short carrier lifetime. One inherent problem with diamond is the presence of defect levels altering the detection characteristics: these may be the cause of an observed instability of the device responses. We have found, however, that it was possible to moderate these trends through the fine-tuning of the growth conditions and of the device preparation steps. Films with **thicknesses ranging** from 5 to 100 mu m have been used for detector fabrication. The role of post-growth treatments and the contact formation procedure was also extensively studied, leading to significant improvements of the detector characteristics. We present recent developments studied at CEA for material optimisation towards its use for specific applications, including radiation hard counters; X-ray intensity, shape and beam position monitors; solar blind photo-detectors, and high dose rate gamma-meters.

32/3,AB/4 (Item 3 from file: 144)
DIALOG(R)File 144:Pascal

15123239 PASCAL No.: 01-0285434
Properties of aluminium nitride coating obtained by vacuum arc discharge method with plasma flow separation
Proceedings of Diamond 2001, the 11th European Conference on
Diamond, Diamond-like Materials, Carbon
Nanotubes, Nitrides and Silicon Carbide
INKIN V N; KIRPILENKO G G; KOLPAKOV A J
ROBERTSON John, ed; KAWARADA Hiroshi, ed; KOHN Erhard, ed; SITAR Zlatko, ed
Patinor Coatings Ltd., NIIMV, Zelenograd, Moscow 103460, Russia
European Conference on Diamond, Diamond-like Materials, Carbon Nanotubes, Nitrides and Silicon Carbide (Diamond 2000), 11 (Porto PRT) 2000-09-03
Journal: Diamond and related materials, 2001, 10 (3-7) 1314-1316
Language: English
Aluminium nitride coating was obtained with the stationary vacuum arc source with separation (filtration) of aluminium plasma flow and nitrogen leak-in into the vacuum chamber at substrate temperature 313-673 K. The growth rate was 5-7 mu m/h. The crystal structure of aluminium nitride films with **thickness** 10-30 **nm** deposited on monocrystalline NaCl substrate was studied by electron diffraction method. The aluminium nitride coatings with **thickness** 1-3 **mu** m were investigated by X-ray examination methods. It was determined that the aluminium nitride coating with the **thickness** up to 30 **nm** has amorphous structure through the whole deposition temperature **range**. At the film **thickness** exceeding 1 **mu** m the coating structure is crystalline with hexagonal lattice. The microhardness of the aluminium nitride coating was 18-20 GPa and their resistivity was 1-2 x 10 SUP 1 SUP 1 OMEGA cm. The aluminium nitride coating with **thickness** 1-3 **mu** m deposited on stainless steel samples preserves them from high temperature oxidation up to 1473 K. It was found out by forcing an indenter and by scribing that the aluminium nitride coating obtained at the mentioned substrate temperatures possesses good adhesion to steel, titanium, silicon, glass, sapphire substrates. Studies of optical characteristics of the aluminium nitride coating showed the possibility of its application as optically sensitive coating.

3/5,AB/5 (Item 1 from file: 350)
DIALOG(R)File 350:Derwent WPIX

011187689
WPI Acc No: 1997-068613/199706
XRPX Acc No: N97-053941

Field emission electron source having electrode with carbon fibres, for use in e.g. flat 2-D display - has electrode with **carbon** fibres incorporating **carbon nano-tubes** forming **uniform** flat **layer** and separate counter electrode, sandwiching perforated grid

Patent Assignee: ECOLE POLYTECHNIQUE FEDERALE LAUSANNE (ECOL-N)
Inventor: CHATELAIN A; DEHEER W A; UGARTE D
Number of Countries: 071 Number of Patents: 002
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 9642101	A1	19961227	WO 96IB573	A	19960611	199706	B
AU 9657770	A	19970109	AU 9657770	A	19960611	199717	

Priority Applications (No Type Date): US 95151 P 19950612
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 9642101	A1	E	24	H01J-001/30	

Designated States (National): AL AM AT AU AZ BB BG BR BY CA CH CN CZ DE DK EE ES FI GB GE HU IL IS JP KE KG KP KR KZ LK LR LS LT LU LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK TJ TM TR TT UA UG US UZ VN
Designated States (Regional): AT BE CH DE DK EA ES FI FR GB GR IE IT KE LS LU MC MW NL OA PT SD SE SZ UG

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
AU 9657770	A			H01J-001/30	Based on patent WO 9642101

Abstract (Basic): WO 9642101 A

The electron source has an electrode (12) with several carbon fibres, and a separate counter electrode, and a voltage source connected between the electrode and the counter electrode. The voltage source applies a high negative voltage to generate at the tip of the fibres a strong electric field causing the tip to emit electrons towards the electrode.

The **carbon** fibres incorporate **carbon nano-tubes** forming a **uniform** microscopically flat **layer** on the substrate (11). An electrically conducting perforated plate or grid (14) is placed between the layer of **nano-tubes** and the counter electrode parallel to the surface of the layer but separate from it by an insulating spacer (13).

USE/ADVANTAGE - For use in field emission in medium vacuum conditions. Provides ultra thin electron source operating at room temp. with overall **thickness ranging** from not more than 20 microns to not less than 200 microns, and with area ranging from not more than 0.1 mm2 to not less than 5 cm2. Can operate at lower electric field strengths compared with conventional field emission electron sources. Operates reliably at much higher pressures i.e. 10-6 Torr. Can be used to produce very large area electron emitting surfaces. Production costs are very low. There are few restrictions on its geometry. Can be used to illuminate phosphor screens at close proximity in e.g. flat cathode ray displays. Can be used as economical alternative electron source for devices utilising conventional ones.

Dwg.1/11

43/3,AB/1 (Item 1 from file: 2)
DIALOG(R)File 2:INSPEC

744754 INSPEC Abstract Number: A2002-24-8115H-042, B2002-12-0520F-067
Title: Large-area deposition of **carbon nanotubes** for field emission displays
Author(s): Young-Jun Park; In-Taek Han; Ha-Jin Kim; Yun-Sung Woo; Nae-Sung Lee; Yong-Wan Jin; Jae-Eun Jung; Chong-Yun Park; Jong-Min Kim
Author Affiliation: FED Project, Samsung Adv. Inst. of Technol., Suwon, South Korea
Conference Title: Making Functional Materials with Nanotubes. Symposium (Materials Research Society Symposium Proceedings Vol.706) p.131-6
Editor(s): Bernier, P.; Ajayan, P.; Iwasa, Y.; Nikolaev, P.
Publisher: Mater. Res. Soc, Warrendale, PA, USA
Publication Date: 2002 Country of Publication: USA xiii+388 pp.
ISBN: 1 55899 642 7 Material Identity Number: XX-2002-02515
Conference Title: Making Functional Materials with Nanotubes. Symposium
Conference Date: 26-29 Nov. 2001 Conference Location: Boston, MA, USA
Language: English
Abstract: A direct synthesis of **carbon nanotubes** (CNTs) on substrates by chemical vapor deposition (CVD) is one of highly probable routes to reach their application to field emission displays. Several stringent requirements are prerequisite for this purpose, including low temperature growth below 600 degrees C to engage glass substrates and large area deposition for practical use. This study carried out synthesis of CNTs by thermal CVD on glass substrates at temperatures as low as 500~550 degrees C. CNTs were grown by thermal decomposition of CO and H/sub 2/ gases at an atmospheric pressure for different thickness of invar (an Fe-Ni-Co alloy) catalytic layers. The growth of CNTs was strongly correlated with preparation of catalytic layers. The diameters and heights of as-grown CNTs increased as the catalytic layers became **thicker** from 1 **nm** to 50 nm. Measurements of the field emission properties of CNTs showed that the threshold electric fields were lowered with increasing thickness of catalytic **layers**. A **uniform** electron emission was observed over a large area of 150*150 mm/sup 2/, with high emission currents and high brightness.
Subfile: A B

43/3,AB/2 (Item 2 from file: 2)
DIALOG(R)File 2:INSPEC

7414770 INSPEC Abstract Number: A2002-23-8115H-006
Title: Effect of catalytic layer thickness on growth and field emission characteristics of **carbon nanotubes** synthesized at low temperatures using thermal chemical vapor deposition
Author(s): Young-Jun Park; In-Taek Han; Ha-Jin Kim; Yun-Sung Woo; Nae-Sung Lee; Yong-Wan Jin; Jae-Eun Jung; Jun-Hee Choi; Deuk-Seok Jung; Chong-Yun Park; Jong-Min Kim
Author Affiliation: FED Project, Samsung Adv. Inst. of Technol., Suwon, South Korea
Journal: Japanese Journal of Applied Physics, Part 1 (Regular Papers, Short Notes & Review Papers) vol.41, no.7A p.4679-85
Publisher: Japan Soc. Appl. Phys,
Publication Date: July 2002 Country of Publication: Japan
CODEN: JAPNDE ISSN: 0021-4922
SICI: 0021-4922(200207)41:7AL.4679:ECLT;1-E
Material Identity Number: F221-2002-013
Language: English
Abstract: The direct synthesis of **carbon nanotubes** (CNTs) on substrates by chemical vapor deposition (CVD) is a highly promising route for their application to field emission displays. Several stringent requirements have to be met for this purpose, including low-temperature growth below 600 degrees C to utilize glass substrates and large-area deposition for practical use. In this study, we carried out the synthesis of CNTs by thermal CVD on glass substrates at temperatures as low as 500-550 degrees C. CNTs were grown by thermal decomposition of CO and H/sub 2/ gases at atmospheric pressure for different thicknesses of Invar (Fe-Ni-Co alloy) catalytic layers. The CNT growth was strongly correlated with the preparation conditions of the catalytic layers. The diameters and heights of as-grown CNTs increased with the catalytic layer **thickness** from 2 **nm** to 30 nm. Measurements of the field emission properties of the CNTs showed that the threshold electric fields decreased with increasing thickness of the catalytic **layers**. **Uniform** electron emission was observed over a large area of 150*150 mm/sup 2/ with high emission current and high brightness.
Subfile: A

43/3,AB/3 (Item 3 from file: 2)
DIALOG(R)File 2:INSPEC

7628917 INSPEC Abstract Number: A2002-20-8115L-007
Title: Continuous Ni-layer on multiwall **carbon nanotubes** by an electroless plating method
Author(s): Kong, F.Z.; Zhang, X.B.; Xiong, W.Q.; Liu, F.; Huang, W.Z.; Sun, Y.L.; Tu, J.P.; Chen, X.W.
Author Affiliation: Dept. of Mater. Sci. & Eng., Zhejiang Univ., Hangzhou, China
Journal: Surface & Coatings Technology vol.155, no.1 p.33-6
Publisher: Elsevier,
Publication Date: 3 June 2002 Country of Publication: Switzerland
CODEN: SCTEEJ ISSN: 0257-8972
SICI: 0257-8972(20020603)155:1L.33:CLMC;1-V
Material Identity Number: C647-2002-012
U.S. Copyright Clearance Center Code: 0257-8972/02/$22.00
Language: English
Abstract: Electroless plating has been successfully applied for nickel coatings on multiwall **carbon nanotubes** (MWNTs) grown by chemical vapor deposition (CVD). The samples before and after coating were checked using transmission electron microscopy (TEM) and X-ray diffraction (XRD). The results showed that the coating process can be divided into two steps: nickel was first deposited as nanoparticles at the activated sites on the pre-treated surface of **carbon nanotubes** in the initial stage; it was then thickened later, as the reaction time increased and eventually formed a continuous **layer**. Finally a **uniform** Ni-**layer** on individual tubes with **thickness** of 20-40 **nm** can be obtained after coating. A simple model for the mechanism of the coating is also discussed.
Subfile: A

4/?/?,AB/4 (Item 4 from file: 2)
DIALOG(R)File 2:INSPEC

?054509 INSPEC Abstract Number: A2001-21-8120V-015
Title: Observation of **carbon nanotubes** synthesized on various substrates using metal-phthalocyanine
Author(s): Katayama, T.; Araki, H.; Kajii, H.; Yoshino, K.
Author Affiliation: Dept. of Electron. Eng., Osaka Univ., Japan
Journal: Synthetic Metals Conference Title: Synth. Met. (Switzerland) vol.121, no.1-3 p.1235-6
Publisher: Elsevier,
Publication Date: 15 March 2001 Country of Publication: Switzerland
CODEN: SYMEDZ ISSN: 0379-6779
SICI: 0379-6779(20010315)121:1/3L.1235:OCNS;1-B
Material Identity Number: S233-2001-006
Conference Title: International Conference on Science and Technology of Synthetic Metals
Conference Date: 15-21 July 2000 Conference Location: Gastein, Austria
Language: English
Abstract: Multiwalled **carbon nanotubes** (MWNT) were synthesized on various substrates by vacuum chemical vapour deposition at ?00-?50 degrees C using (Co, Ni, Fe)-phthalocyanines (Pcs) as source materials. Intense growth was observed on a quartz plate with a low surface tension and an oxidized surface of an Al plate. **Nanotubes** grew only at the micro-defects of Ni, Fe and stainless foils and only at uneven sites of Ta and W foils. No growth was observed on a smooth area of Ta and W foils with large surface tensions. When vapours of these metals impinge onto the substrate from the vapour phase, they may aggregate to a **nanometer-sized** particle with a high contact angle against the substrate because of their hard wetting, and nucleation of MWNTs may occur on the particle. We also performed CVD synthesis of MWNTs in a H/sub 2//Ar gas flow. When FePc was used as source **material, uniformly** aligned **nanotubes** grew at the edges of a quartz plate and the inner wall of a quartz tube.
Subfile: A

43/3,AB/5 (Item 5 from file: 2)
DIALOG(R)File 2:INSPEC

4[illegible]661 INSPEC Abstract Number: A9323-6855-042
Title: Use of **fullerene films** as surfaces of **uniform** electric potential
Author(s): Camp, J.B.; Schwarz, R.B.
Author Affiliation: Div. of Phys., Los Alamos Nat. Lab., NM, USA
Journal: Applied Physics Letters vol.63, no.4 p.455-7
Publication Date: 26 July 1993 Country of Publication: USA
CODEN: APPLAB ISSN: 0003-6951
U.S. Copyright Clearance Center Code: 0003-6951/93/63(4)/455/3/$6.00
Language: English
Abstract: Continuous **fullerene** films (85% C/sub 60/, 15% C/sub 70/) of **thickness** approximately 10 **nm** have been sublimed on a metallic substrate previously coated with a 1 **nm-thick** Ge sublayer. The films show no surface potential variations when scanned with a Kelvin probe of 1 mV and 1 mm potential and spatial resolutions. Transmission electron microscopy reveals the **fullerene** films to be amorphous.
Subfile: A

43/3,AB/6 (Item 1 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

05625911
E.I. No: EIP00085289905
Title: Supercritical CO//2-based production of **fullerene** nanoparticles
Author: Chattopadhyay, Pratibhash; Gupta, Ram B.
Corporate Source: Aurburn Univ, Auburn, AL, USA
Source: Industrial and Engineering Chemistry Research v 39 n 7 Jul 2000. p 2281-2289
Publication Year: 2000
CODEN: IECRED ISSN: 0888-5885
Language: English
Abstract: **Fullerene** nanoparticles have potential uses in a variety of applications including pharmaceuticals, lubricants, composite materials, specialized coatings, and interfacing membrane surfaces. In this study, the supercritical antisolvent process is used to reduce **fullerene** particle **size** from 40 **mu** m to as low as 29 nm. C//6//0 dissolved in toluene is injected into supercritical CO//2, causing precipitation of C//6//0 as fine particles. Because of the high diffusivity of CO//2 in toluene, a rapid supersaturation is achieved, which results in the formation of C//6//0 nanoparticles with a narrow size distribution. The effect of pressure, temperature, and jet velocity on particle size and morphology is studied. The particle size increases linearly with the density of supercritical CO//2. A high jet velocity yields spherical particles whereas a lower jet velocity yields both spherical and rodlike particles. In most cases, a **uniform** thin **film** of the particles is obtained on the collection plate. (Author abstract) 33 Refs.

?:/?,AB/? (Item ? from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

??676974 Genuine Article#: 691MN Number of References: 22
Title: Coating single-walled **carbon nanotubes** with tin oxide (ABSTRACT AVAILABLE)
Author(s): Han WQ; Zettl A (REPRINT)
Corporate Source: Univ Calif Berkeley,Dept Phys,Berkeley//CA/94720 (REPRINT); Univ Calif Berkeley,Dept Phys,Berkeley//CA/94720; Univ Calif Berkeley,Lawrence Berkeley Lab, Div Mat Sci,Berkeley//CA/94720
Journal: NANO LETTERS, 2003, V3, N5 (MAY), P681-683
ISSN: 1530-6984 Publication date: 20030500
Publisher: AMER CHEMICAL SOC, 1155 16TH ST, NW, WASHINGTON, DC 20036 USA
Language: English Document Type: ARTICLE
Abstract: Single-walled **carbon nanotubes** coated with crystalline tin oxide by a simple chemical-solution route are reported. The room-temperature chemical treatment results in a nominally complete and **uniform coating** over the entire outer surface of singular **nanotubes**, **nanotube** bundles, and also **fullerene**-like nanoparticles. The samples have been characterized by high-resolution transmission electron microscopy, energy-dispersive X-ray spectrometry, and X-ray diffraction. The coating is composed of interconnected SnO_2 nanoparticles of **sizes** between 1-6 **nm**. Typically, the coatings have a total thickness on the order of the constituent nanoparticle size.

[illegible],AB/8 (Item 2 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

[illegible] Genuine Article#: 593UA Number of References: 27
Title: Helical crystalline SiC/SiO2 core-shell nanowires (ABSTRACT AVAILABLE)
Author(s): Zhang HF; Wang CM; Wang LS (REPRINT)
Corporate Source: Washington State Univ,Dept Phys,2710 Univ Dr/Richland//WA/99352 (REPRINT); Washington State Univ,Dept Phys,Richland//WA/99352; Battelle Mem Inst,Pacific NW Natl Labs, WR Wiley Environm Mol Sci Lab,Richland//WA/99352
Journal: NANO LETTERS, 2002, V2, N9 (SEP), P941-944
ISSN: 1530-6984 Publication date: 20020901
Publisher: AMER CHEMICAL SOC, 1155 16TH ST, NW, WASHINGTON, DC 20036 USA
Language: English Document Type: ARTICLE
Abstract: Helical crystalline silicon carbide nanowires; covered with a silicon oxide sheath (SiC/SiO2) have been synthesized by a chemical vapor deposition technique. The SiC core typically has diameters of 10-40 nm with a helical periodicity of 40-80 nm and is covered by a **uniform layer** of 30-60 **nm thick** amorphous SiO2.
A screw-dislocation-driven growth process is proposed for the formation of this novel structure based on detailed structural characterizations. The helical nanostructures may find applications as building blocks in nanomechanical or nanoelectronic devices. The screw-dislocation-induced growth mechanism suggests that similar helical nanostructures; of a wide range of materials may be synthesized.

3/3,AB/4 (Item 3 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

0279860 Genuine Article#: VM259 Number of References: 5
Title: OXIDATION PROTECTIVE CARBON LAYER FOR MAGNETIC PARTICLES BY
SURFACTANT REDUCTION (Abstract Available)
Author(s): JEYADEVAN B; SUZUKI Y; TOHJI K; MATSUOKA I
Corporate Source: TOHOKU UNIV,DEPT RESOURCES ENGN,AOBA KU/SENDAI/MIYAGI
98077/JAPAN/
Journal: IEEE TRANSACTIONS ON MAGNETICS, 1996, V32, N5 (SEP), P4511-4513
ISSN: 0018-9464
Language: ENGLISH Document Type: ARTICLE
Abstract: Encapsulation of fine metal particles by graphite would not only provide an oxidation protective layer but also acts as a solid lubricant that enables high speed scanning of magnetic tapes against a writing/recording head. In this paper, we propose a novel method to produce the graphite layer on the surface of magnetic particles. First, the surfactant is adsorbed onto the particle and then reduced/decomposed by bombardment of this treatment, the magnetite particles are **uniformly coated** with a graphite layer of a few **nanometers thick**.

4/3,AB/10 (Item 4 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

[illegible] Genuine Article#: GK727 Number of References: 14
Title: DEPOSITION AND CHARACTERIZATION OF **FULLERENE** FILMS (Abstract Available)
Author(s): HEBARD AF; HADDON RC; FLEMING RM; KORTAN AR
Corporate Source: AT&T BELL LABS/MURRAY HILL//NJ/07974
Journal: APPLIED PHYSICS LETTERS, 1991, V59, N17, P2109-2111
Language: ENGLISH Document Type: ARTICLE
Abstract: Thermal sublimation of pure C60 and C70 has been used for depositing well-characterized **fullerene** films on a variety of substrates. Film purity is determined by infrared absorption spectra and the extent of crystallinity of the face-centered cubic structure by x rays. Thickness-dependent optical and electrical measurements reveal **uniform films** over the **thickness** range 200-1000 **angstrom**. We obtain optical absorption coefficients having values between those of Si and Ge and a relative permittivity having a value close to that of amorphous SiO2.

43/3,AB/11 (Item 1 from file: 144)
DIALOG(R)File 144:Pascal

14657733 PASCAL No.: 00-0320246
Supercritical CO SUB 2 -based production of **fullerene** nanoparticles
CHATTOPADHYAY P; GUPTA R B
Department of Chemical Engineering, Auburn University, Auburn, Alabama 36839-5127, United States
Journal: Industrial & engineering chemistry research, 2000, 39 (7) 2281-2289
Language: English
Fullerene nanoparticles have potential uses in a variety of applications including pharmaceuticals, lubricants, composite materials, specialized coatings, and interfacing membrane surfaces. In this study, the supercritical antisolvent process is used to reduce **fullerene** particle **size** from 40 **mu** m to as low as 29 nm. C SUB 6 SUB 0 dissolved in toluene is injected into supercritical CO SUB 2 , causing precipitation of C SUB 6 SUB 0 as fine particles. Because of the high diffusivity of CO SUB 2 in toluene, a rapid supersaturation is achieved, which results in the formation of C SUB 6 SUB 0 nanoparticles with a narrow size distribution. The effect of pressure, temperature, and jet velocity on particle size and morphology is studied. The particle size increases linearly with the density of supercritical CO SUB 2 . A high jet velocity yields spherical particles whereas a lower jet velocity yields both spherical and rodlike particles. In most cases, a **uniform** thin **film** of the particles is obtained on the collection plate.

[illegible] Item 1 from file: 350
[illegible] File 350:Derwent WPIX

015383088
WPI Acc No: 2003-444031/200342
XRAM Acc No: C03-117975
Composite carbon structure for producing single wall **nano tubes**, comprises **carbon** nanoparticles, binder and carbon-coated catalyst nanoparticles comprising **nanometer sized** catalyst particle having carbon coatings
Patent Assignee: SONY CORP (SONY)
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
JP 2003054922	A	20030226	JP 2001245481	A	20010813	200342	B

Priority Applications (No Type Date): JP 2001245481 A 20010813
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
JP 2003054922	A		49	C01B-031/02	

Abstract (Basic): JP 2003054922 A
Abstract (Basic):

NOVELTY - Composite carbon structure comprises carbon-coated catalyst nanoparticles, carbon nanoparticles and binder. The carbon-coated catalyst nanoparticles comprises **nanometer-sized** catalyst particle surrounded by carbon coating.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

(1) method of making single wall **nano tubes** (SWNT) which involves using composite carbon structure as electrode (E1), and performing electric discharge with electrode (E1) and electrode (E2) comprising carbon;

(2) manufacture of composite carbon structure which involves generating soot with a carbon rod that is filled with catalyst, collecting soot, grinding soot, mixing soot with binder material to form intermediate product (PI1), pressing intermediate product (PI1), heating intermediate product and cooling intermediate product;

(3) catalytic support for chemical vapor deposition comprising inorganic catalyst support **material uniformly** mixed with carbon **coated** catalyst nanoparticles having **nanometer-sized** catalyst particles surrounded by carbon coating;

(4) method of forming carbon nano structure by chemical vapor deposition which involves heating catalytic support and supplying carbon source to catalytic support so as to grow carbon structure; and

(5) preparation of catalyst for chemical vapor deposition involves generating soot from carbon rod filled catalyst such that soot includes carbon-coated catalyst nanoparticles, collecting soot, purifying soot by removing particles other than carbon-coated catalyst nanoparticles, suspending purified soot in solvent and dispersing purified soot onto catalyst support material.

USE - For manufacturing carbon nano structure and single wall **nano tubes** (claimed).

ADVANTAGE - The catalyst nanoparticles are readily used during short reaction times associated with the production of carbons nano

structure, hence need not be broken down from micrometer size and are completely used during short reactions. The complete use of catalyst nanoparticles enables to produce a highly pure carbon nano structure. The carbon coating on the catalyst prevents them from oxidation and introduction of oxygen into the reaction zone. Therefore the carbon nano structure has reduced defects, and is amorphous.

DESCRIPTION OF DRAWING(S) - The figure shows the formation of single wall **nano tube** using **carbon** coated catalyst nanoparticles as starting material.

carbon coated catalyst nanoparticles (1)

single wall **carbon nano tube** (22)

nanometer sized carbon particles (30)

pp; 49 DwgNo 1/5

[illegible] Item 2 from file: 35[illegible]
DIALOG(R)File [illegible]:Derwent WPIX

[illegible]
WPI Acc No: 2002-439039/200247
XRAM Acc No: C02-125075
Nano diamond useful as slurry-form abrasive, is obtained by heating **carbon nano tube** at high temperature and pressure
Patent Assignee: DOKURITSU GYOSEI HOJIN BUSSHITSU ZAIRYO (DOKU-N)
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
JP 2002066302	A	20020305	JP 2000258567	A	20000829	200247	B

Priority Applications (No Type Date): JP 2000258567 A 20000829
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
JP 2002066302	A		6	B01J-003/06	

Abstract (Basic): JP 2002066302 A
Abstract (Basic):

NOVELTY - The nano diamond is obtained by heating a **carbon nano tube** at a high pressure of 10 GPa or more, and at 1[illegible] degreesC or more.

DETAILED DESCRIPTION - The nano diamond has grain **size** of 20-50 **nm**, and has octahedron structure. An INDEPENDENT CLAIM is included for nano diamond manufacturing method.

USE - Useful as slurry-form abrasives, used for cutting and polishing of recording medium.

ADVANTAGE - The nano diamond as **diamond** sintered compact has **uniform** grain size. The nano diamond is manufactured easily.

DESCRIPTION OF DRAWING(S) - The figure shows the perspective diagram of the outline of the apparatus used for producing a nano diamond.

pp; 6 DwgNo 1/6

[illegible],AB 14 (Item [illegible] from file: [illegible])
[illegible] File [illegible]:Derwent WPIX

[illegible]
WPI Acc No: 2002-097379/200213
XRAM Acc No: C02-030239
XRPX Acc No: N02-071990
Making substrates, i.e. drug delivery device, biocompatible, involves contacting oppositely charged substrate and starting material, and initiating alternating charge layer electrostatic self-assembly to form thin film
Patent Assignee: CLAUS R O (CLAU-I); SPILLMAN W B (SPIL-I); VIRGINIA TECH INTELLECTUAL PROPERTIES (VIRG); WANG Y (WANG-I)
Inventor: CLAUS R O; SPILLMAN W B; WANG Y
Number of Countries: 095 Number of Patents: 004
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 200178906	A1	20011025	WO 2001US12042	A	20010413	200213	B
AU 200153442	A	20011030	AU 200153442	A	20010413	200219	
US [illegible]	A1	20020328	US 2000197776	P	20000414	[illegible]	
			US 2001833783	A	20010413		
EP 1280613	A1	20030205	EP 2001926941	A	20010413	200310	
			WO 2001US12042	A	20010413		

Priority Applications (No Type Date): US 2000197776 P 20000414; US [illegible] 183378[illegible] A 20010413
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 200178906	A1	E	54	B05D-001/04	

Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW
Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
AU 200153442	A			B05D-001/04	Based on patent WO 200178906
US [illegible]	A1			B32B-[illegible]	Provisional application US [illegible]
EP 1280613	A1	E		B05D-001/04	Based on patent WO 200178906

Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR

Abstract (Basic): WO 200178906 A1
Abstract (Basic):
NOVELTY - A substrate is made biocompatible by contacting at least a portion of a charged substrate (1) with an oppositely charged starting material, and constructing a multi-layered film of alternating charged molecular layers on the substrate by electrostatic self-assembly. The starting material is a polymer (3).
DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a biocompatible medical device or drug delivery device comprising a substrate, and an electrostatically self-assembled thin film.
USE - The method is for making materials, i.e. drug delivery device or medical device, biocompatible. It is useful in tissue engineering, and bone implantation. It may be used in (rubber) tubing used in dialysis or in heart lung machines, bandaging material, artificial hip, pacemaker, catheter, or stent.

ADVANTAGE - A biocompatible thin **film** that is **uniform** and homogeneous can be provided using the process.

DESCRIPTION OF DRAWING(S) - The figure shows a cross-sectional view of a thin film being made by electrostatic self-assembly.

Substrate (1)

Polymer (3)

Monolayer (4)

pp; 54 DwgNo 10b/10

[illegible]

PRODUCTION OF SINGLE LAYERED **NANOTUBE**

PUB. NO.: 11-116218 [JP 11116218 A]
PUBLISHED: April 27, 1999 (19990427)
INVENTOR(s): YAMAGUCHI CHIHARU
MATSUMURA YUJI
MATSUI FUMIO
APPLICANT(s): OSAKA GAS CO LTD
APPL. NO.: 09-285360 [JP 97285360]
FILED: October 17, 1997 (19971017)

ABSTRACT

PROBLEM TO BE SOLVED: To produce single **layered nanotubes** relatively **uniform** in diameter and length in a high yield.

SOLUTION: When **carbon nanotubes** are produced by a dry process such as laser beam vapor deposition, resistance heating, arc discharge, high-frequency induction heating, a plasma process, thermo-CVD, electron beam vapor deposition or combustion, starting material used is (1) highly metal dispersed carbon, that is, carbon contg. dispersed metal particles of ≤100 **nm** particle **size**, e.g. metal dispersed carbon obtd. by adding starting material for the metal to starting material for carbon and carrying out liq. phase reaction and carbonization, metal plated carbon, metal intercalated or doped carbon or a metal-carbon composite material obtd. by mechanical alloying, (2) metal combined carbon particles, that is, metal-carbon combined particles of ≤100 **nm** particle **size**, e.g. metal-carbon combined particles obtd. by feeding starting material for carbon such as methane and starting material for the metal such as an organometallic compd. into plasma or (3) methane and a metal or its compd.

[illegible] 12:36:29 User267149 Session D860.1

SYSTEM:[illegible] - DIALOG OneSearch
  File 2:INSPEC 1969-2003/Jul W2
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*File 6: Alert feature enhanced for multiple files, duplicates
removal, customized scheduling. See HELP ALERT.
  File 8:Ei Compendex(R) 1970-2003/Jul W2
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removal, customized scheduling. See HELP ALERT.
  File 34:SciSearch(R) Cited Ref Sci 1990-2003/Jul W3
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  File 99:Wilson Appl. Sci & Tech Abs 1983-2003/Jun
         (c) 2003 The HW Wilson Co.
  File 144:Pascal 1973-2003/Jul W2
         (c) 2003 INIST/CNRS
  File [illegible]:Analytical Abstracts 1980-2003/Jun W[illegible]
         (c) 2003 Royal Soc Chemistry
*File 305: Alert feature enhanced for multiple files, duplicate
removal, customized scheduling. See HELP ALERT.
  File 315:ChemEng & Biotec Abs 1970-2003/Jun
         (c) 2003 DECHEMA
  File 350:Derwent WPIX 1963-2003/UD,UM &UP=200347
         (c) 2003 Thomson Derwent
  File 347:JAPIO Oct 1976-2003/Mar(Updated [illegible])
         (c) 2003 JPO & JAPIO
*File 347: JAPIO data problems with year 2000 records are now fixed.
Alerts have been run. See HELP NEWS 347 for details.
  File 344:Chinese Patents Abs Aug 1985-2003/Mar
         (c) 2003 European Patent Office
  File [illegible]:French Patents 1961-2002/BOPI 200209
         (c) 200[illegible] INPI. All rts. reserv.
*File [illegible]: This file is not currently updating. The last update is [illegible].

Set	Items	Description
S1	109	AU=(DIMITRIJEVIC, S? OR DIMITRIJEVIC S?)
S2	391	AU=(WITHERS, J? OR WITHERS J?)
S3	579	AU=(LOUTFY, R? OR LOUTFY R?)
S4	5	S1 AND S2
S5	2	RD (unique items)
S6	1	S1 AND S3
S7	0	S6 NOT S4
S8	[illegible]	[illegible] AND S3
S9	24	S8 AND (NANOTUBE? ? OR NANO()TUBE? ? OR NANOFILAMENT?? OR NANO()FILAMENT?? OR NANOFIBRE? ? OR NANO()FIBRE? ? OR NANOFIBER?? OR NANO()FIBER? ? OR NANOFIBRIL? ? OR NANO()FIBRIL? ? OR FULLERENE)
S10	15	RD (unique items)
S11	14	S10 NOT S4

5/3,AB/1 (Item 1 from file: 2)
DIALOG(R) File 2:INSPEC

6397490 INSPEC Abstract Number: A1999-24-7970-001
Title: Electron emission from films of carbon nanotubes and ta-C coated nanotubes
Author(s): **Dimitrijevic, S.; Withers, J.C.;** Mammana, V.P.; Monteiro, O.R.; Ager, J.W., III; Brown, I.G.
Author Affiliation: MER Corp., Tucson, AZ, USA
Journal: Applied Physics Letters vol.75, no.17 p.2680-2
Publisher: AIP,
Publication Date: 25 Oct. 1999 Country of Publication: USA
CODEN: APPLAB ISSN: 0003-6951
SICI: 0003-6951(19991025)75:17L.2680:EEFF;1-3
Material Identity Number: A135-1999-042
U.S. Copyright Clearance Center Code: 0003-6951/99/75(17)/2680(3)/$15.00
Language: English
Abstract: The field emission properties of multiwall carbon nanotube films with and without a coating of tetrahedrally bonded amorphous carbon (ta-C) were investigated. Voltage thresholds of 2.4 V/ mu m for uncoated films and 1.5 V/ mu m for ta-C coated films were found. The results for the uncoated films are in good agreement with previous measurements of field emission from carbon nanotubes. The effect of the ta-C coating on the emission properties is discussed in light of current field emission models.
Subfile: A

8/3,AB/2 (Item 1 from file: 350)
DIALOG(R)File 350:Derwent WPIX

014086370
WPI Acc No: 2001-570584/200164
XRAM Acc No: C01-169587
XRPX Acc No: N01-425032

Nanotube used in electron field emitters, e.g. flat panel displays, cathode ray tubes, has specified thickness of uniform coating of diamond or diamond-like carbon

Patent Assignee: FULLERENE INT CORP (FULL-N)
Inventor: **DIMITRIJEVIC S**; LOUTFY R O; **WITHERS J C**
Number of Countries: [illegible] Number of Patents: 005
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 200161719	A1	20010823	WO 2001US5229	A	20010216	200164	B
US 20010024078	A1	20010927	US 2000182834	P	20000216	200164	
			US 2001784910	A	20010216		
AU 200137064	A	20010827	AU 200137064	A	20010216	200176	
EP 1256124	A1	20021113	EP 2001908791	A	20010216	200282	
			WO 2001US5229	A	20010216		
KR 2002077411	A	20021012	KR 2002710712	A	20010216	200321	

Priority Applications (No Type Date): US 2000182834 P 20000216; US 2001784910 A 20010216

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes
WO 200161719 A1 E 34 H01J-001/304
Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW
US 20010024078 A1 H01J-001/30 Provisional application US 2000182834

AU 200137064 A H01J-001/304 Based on patent WO 200161719
EP 1256124 A1 E H01J-001/304 Based on patent WO 200161719
Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR
KR 2002077411 A H01J-001/30

Abstract (Basic): WO 200161719 A1
Abstract (Basic):

NOVELTY - A nanotube has a uniform coating of diamond or diamond-like carbon, in which the coating is 10-100 nm thick.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:

(A) a field emission cathode in an electron field emitter comprising a substrate, nanotubes coating the substrate, and a uniform coating of diamond or diamond-like carbon on the nanotubes, in which the diamond and diamond-like carbon has a negative electron affinity which retards the evaporation of carbon from the nanotubes when the cathode is utilized in electron field emission;

(B) a method of enhancing the electron field emission from an electron field emitter having a cathode consisting of nanotubes coating a substrate, comprising uniformly coating the nanotube with an

enhancing field emission effective amount of either diamond or diamond-like carbon; and

(C) a method for retarding the evaporation of carbon from an electron field emitter.

USE - Used in electron field emitters, e.g. flat panel displays, cathode ray tube (CRT), and multiple CRT displays.

ADVANTAGE - The nanotubes have enhanced electron emission characteristics, and retard and prevent the evaporation of carbon from carbon nanotubes during operation.

pp; 47 DwgNo 0/8

11/3,AB/1 (Item 1 from file: 2)
DIALOG(R)File 2:INSPEC

5621204 INSPEC Abstract Number: A9724-8110D-006
Title: Purification of C/sub 84/ by selective crystallization
Author(s): Lowe, T.P.; **Withers, J.C.; Loutfy, R.O.**; Saleh, M.Y.
Author Affiliation: MER Corp., Tucson, AZ, USA
Conference Title: Proceedings of the Symposium on Recent Advances in the Chemistry and Physics of Fullerenes and Related Materials. Vol.3 p.[illegible]
Editor(s): Kadish, K.M.; Ruoff, R.S.
Publisher: Electrochem. Soc, Pennington, NJ, USA
Publication Date: 1996 Country of Publication: USA xvii+1367 pp.
Material Identity Number: XX96-02383
Conference Title: Proceedings of Fullerenes: Recent Advances in the Chemistry and Physics of Fullerenes and Related Materials. Vol.3
Conference Date: 5-10 May 1996 Conference Location: Los Angeles, CA, USA
Language: English
Abstract: Selected higher-order fullerenes are crystallized from a mixture of fullerenes in an appropriate solvent upon concentration of the solution. A mixture of higher-order fullerenes is first extracted with a solvent in which the target molecule has a higher solubility than its larger homologs. The appropriate temperature is used to maximize the solubility differences. The target molecule is then precipitated selectively by formation of crystals during the concentration of the solution. During the concentration process, the appropriate temperature is again used to maximize the separation. The specific **fullerene** is therefore isolated by bracketing its solubility; the **fullerene** is more soluble than larger fullerenes in a given solvent, but limited solubility causes its precipitation to occur before other, smaller fullerenes. The crystallization process often requires two or three repetitions to produce highly purified (90-95%) **fullerene** . Conversely, the targeted **fullerene** may be the more soluble component in the mixture, and would be concentrated in the supernatant during the therefore.
Subfile: A

11/,AB/2 (Item 2 from file: 2)
DIALOG(R)File 2:INSPEC

5646654 INSPEC Abstract Number: A9710-6146-002
Title: **Fullerene** commercial vision
Author(s): **Withers, J.C.; Loutfy, R.O.;** Lowe, T.P.
Author Affiliation: Mater. & Electrochem. Res. Corp., Tucson, AZ, USA
Journal: Fullerene Science and Technology vol.5, no.1 p.1-31
Publisher: Marcel Dekker,
Publication Date: 1997 Country of Publication: USA
CODEN: FTECEG ISSN: 1064-122X
SICI: 1064-122X(1997)5:1L.1:FCV;1-X
Material Identity Number: A140-97001
U.S. Copyright Clearance Center Code: 1064-122X/97/$10.00
Language: English
Abstract: Given the wide variety of **fullerene** morphology, their unique chemical and physical properties and the unsurpassed amount of **fullerene** research being conducted, it is strange that no commercial applications for these truly unique forms of carbon have surfaced. The many potential applications of fullerenes include their use as chemical reagents, material modifiers, electrodes, gas storage devices, optical filters, sensors, and a raft of other uses not touched upon here. The barriers to the rapid development of **fullerene** technology include the high cost of production of purified products, which is due in part to the low yield in the initial product of the arc production process, and to the limited solubility of spherical fullerenes in most solvents. Improvements in the ability to scale up production methods are expected to reduce the cost of **fullerene** materials, thereby opening the way to their use as improved replacements for existing materials and as innovative materials in their own right.
Subfile: A

11/3,AB/3 (Item 3 from file: 2)
DIALOG(R)File 2:INSPEC

5200952 INSPEC Abstract Number: A9607-8120-005
Title: The formation of fullerenes from sonic velocity gaseous carbon
Author(s): Pan, C.; **Withers, J.C.; Loutfy, R.O.**
Author Affiliation: MER Corp., Tucson, AZ, USA
Journal: Fullerene Science and Technology vol.4, no.1 p.49-65
Publisher: Marcel Dekker,
Publication Date: 1996 Country of Publication: USA
CODEN: FTTCEG ISSN: 1064-122X
SICI: 1064-122X(1996)4:1L.49:FFFS;1-U
Material Identity Number: A140-96001
Language: English
Abstract: A contact arc and adiabatic expansion hybrid reactor has been utilized to provide a controlled cooling process of gaseous carbon species capable of attaining very high velocities. Both vaporization and annealing temperatures and annealing time were found to be important for the formation of fullerenes. Immediate rapid quenching of gaseous carbon resulted in the reduction of **fullerene** yields. However, rapid quenching was demonstrated to improve the **fullerene** yield by preserving the as-grown fullerenes in the high temperature annealing process.
Subfile: A

11/3,AB/4 (Item 4 from file: 2)
DIALOG(R)File 2:INSPEC

4710326 INSPEC Abstract Number: A9416-6116P-008
Title: Single-shell carbon **nanotubes** imaged by atomic force microscopy
Author(s): Hoper, R.; Workman, R.K.; Dong Chen; Sarid, D.; Yadav, T.; **Withers, J.C.; Loutfy, R.O.**
Author Affiliation: Opt. Sci. Center, Arizona Univ., Tucson, AZ, USA
Journal: Surface Science vol.311, no.3 p.L731-6
Publication Date: 20 May 1994 Country of Publication: Netherlands
CODEN: SUSCAS ISSN: 0039-6028
U.S. Copyright Clearance Center Code: 0039-6028/94/$07.00
Language: English
Abstract: Single-shell carbon **nanotubes** , approximately 1 nm in diameter, have been imaged for the first time by atomic force microscopy operating in both the contact and tapping modes. For the contact mode, the height of the imaged **nanotubes** has been calibrated using the atomic steps of the silicon substrate on which the **nanotubes** were deposited. For the tapping mode, the calibration was performed using an industry-standard grating. The paper discusses substrate and sample preparation methods for the characterization by scanning probe microscopy of **nanotubes** deposited on a substrate.
Subfile: A

[illegible]3,AB/[illegible] (Item 5 from file: 2)
DIALOG(R)File 2:INSPEC

04388228 INSPEC Abstract Number: A9311-6155D-003
Title: Imaging **fullerene** C/sub 60/ with atomic resolution using a scanning tunnelling microscope
Author(s): Koruga, D.; Simic-Krstic, J.; Trifunovic, M.; Jankovic, S.; Hameroff, S.; **Withers, J.C.; Loutfy, R.O.**
Author Affiliation: MER Corp., Tucson, AZ, USA
Journal: Fullerene Science and Technology vol.1, no.1 p.93-1[illegible]
Publication Date: 1993 Country of Publication: USA
CODEN: FTECEG ISSN: 1064-122X
Language: English
Abstract: C/sub 60/ was purified and imaged utilizing scanning tunnelling microscopy (STM) in a constant current mode. By fixing the fullerenes on the substrate ('frozen state'-no movement or rotation), direct imaging of C/sub 60/ with atomic resolution was possible, showing one pentagon and one hexagon carbon ring of C/sub 60/.
Subfile: A

11/3,AB/6 (Item 1 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

[illegible]37581
E.I. No: EIP93101111330
Title: Thermal diffusivity/conductivity of a compact of C[illegible]
fullerene
Author: Hasselman, D.P.H.; Donaldson, K.Y.; **Withers, J.; Loutfy, R.O.**
Corporate Source: Virginia Polytechnic Inst, Blacksburg, VA, USA
Source: Carbon v 31 n 6 1993. p 996-998
Publication Year: 1993
CODEN: CRBNAH ISSN: 0008-6223
Language: English
Abstract: Experimental results show that in general, the magnitude of the thermal diffusivity/conductivity values for the samples used in this study are well below the values for the other crystal structures of carbon such as diamond and pyrilytic graphite within the basal plane and even transverse to the basal plane. The magnitude of the thermal diffusivity and/or conductivity of the compacts of this study at room temperature is of the same order as those found for carbon black, carbon felt and granulated carbon soot. 1[illegible] Refs.

?? ?,AB/? Item 2 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

?699899
E.I. No: EIP93091067859
Title: Effect of processing conditions on the morphology and yield of carbon **nanotubes**
Author: Seraphin, Supapan; Zhou, Dan; Jiao, Jun; **Withers, James C.**; **Loutfy, Raouf**
Corporate Source: Univ of Arizona, Tucson, AZ, USA
Source: Carbon v 31 n 5 1993. p 685-689
Publication Year: 1993
CODEN: CRBNAH ISSN: 0008-6223
Language: English
Abstract: Morphology and fractional yield of carbon **nanotubes** depend strongly on the gas pressure in the reaction zone, as well as current density driven by different potentials across the electrodes. We report results on the correlation caused by variations in the processing conditions, using transmission electron microscopy. In addition to **nanotubes**, we observed various shapes of graphite particles such as tetrahedra and polyhedra. (Author abstract) 6 Refs.

1/1,AB (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

01943128 Genuine Article#: KW453 Number of References: 4
Title: YTTRIUM CARBIDE IN **NANOTUBES**
Author(s): SERAPHIN S; ZHOU D; JIAO J; **WITHERS JC; LOUTFY R**
Corporate Source: UNIV ARIZONA,DEPT MAT SCI & ENGN/TUCSON//AZ/85721; UNIV
ARIZONA,DEPT PHYS/TUCSON//AZ/85721; MAT & ELECTROCHEM RES
CORP/TUCSON//AZ/85706
Journal: NATURE, 1993, V362, N6420 (APR 8), P503
ISSN: 0028-0836
Language: ENGLISH Document Type: LETTER

[illegible] (Item 1 from file: 65)
DIALOG(R)File 65:Inside Conferences

[illegible]0278 INSIDE CONFERENCE ITEM ID: CN015592853
Fullerene Prices: How Low Will They Be?
Withers, J. C.; Pan, C.; **Loutfy, R. O.**
CONFERENCE: Recent advances in the chemistry and physics of fullerenes and related materials-Symposium; 1st
PROCEEDINGS- ELECTROCHEMICAL SOCIETY PV, 1994; VOL 94-24 P: 22-39
Pennington, Electrochemical Society Inc, 1994
ISBN: 1566770823
LANGUAGE: English DOCUMENT TYPE: Conference Papers
CONFERENCE EDITOR(S): Kadish, K. M.; Ruoff, R. S.
CONFERENCE SPONSOR: Electrochemical Society Fullerenes Group
CONFERENCE LOCATION: San Francisco, CA
CONFERENCE DATE: May 1994 (199405) (199405)
NOTE:
Held as pt of the 185th Meeting of the Electrochemical Society

11/?,AB/10 (Item 1 from file: 144)
DIALOG R File 144:Pascal

111.59?? PASCAL No.: 93-0632998
Thermal diffusivity/conductivity of a compact of C SUB ? SUP ?
fullerene
HASSELMAN D P H; DONALDSON K Y; **WITHERS J; LOUTFY R O**
Virginia polytech. inst., dep. materials sci. eng., thermophysical res. lab., Blacksburg VA 24061-0237, USA
Journal: Carbon : New York, 1993, 31 (6) 996-998
Language: English

11/5,AB/11 (Item 1 from file: 350)
DIALOG(R)File 350:Derwent WPIX

[illegible]91544
WPI Acc No: 2003-352527/200333
XRAM Acc No: C03-092813
XRPX Acc No: N03-281517
Fluid complex used as heat transfer agent in closed heat transfer systems, comprises heat transfer fluid containing suspended carbon nanoparticles of specific bonding type to enhance thermal conductivity of fluid
Patent Assignee: LOUTFY R O (LOUT-I); WITHERS J C (WITH-I); MATERIALS & ELECTROCHEMICAL RES CORP (MATE-N)
Inventor: **LOUTFY R O; WITHERS J C**
Number of Countries: 022 Number of Patents: 002
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 20020100578	A1	20020801	US 2001265547	P	20010130	200333	B
			US 200259716	A	20020129		
WO 200304944	A2	20030116	WO 2002US3556	A	20020129	200333	

Priority Applications (No Type Date): US 2001265547 P 20010130; US [illegible]59716 A 20020129
Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 20020100578	A1	[illegible]	C09K-005/10	Provisional application US 2001265547
WO 200304944	A2	E	F28B-000/00	

Designated States (National): CA JP
Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR

Abstract (Basic): US 20020100578 A1
Abstract (Basic):

NOVELTY - A fluid complex comprises a heat transfer fluid containing suspended carbon nanoparticles to enhance the thermal conductivity of the fluid. The carbon nanoparticles comprise carbon of sp2 type bonding and sp3 type bonding.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for method of transferring heat energy between thermally separated components comprising heat transfer agent.

USE - As heat transfer agent in closed heat transfer systems.

ADVANTAGE - The novel fluid complex improves heat transfer between components of a heat exchange system. The carbon nanofluid results in significant energy and cost savings for heat transfer thermal management, and supports miniaturization of heat exchanger systems. With the use of nanofluids, power densities are increased while dramatically reducing heat exchange pumping power. The addition of the carbon-based nanoparticles increases the connective heat transfer coefficient in a solid-fluid two-phase system. The carbon nanoparticles enhance the thermal conductivity of the fluid at any temperature by increasing the surface area and heat capacity of the fluid and flattening the transverse temperature gradient of the fluid.

pp; 7 DwgNo 0/0

??/?,AB/12 (Item 2 from file: 350)
DIALOG(R)File 350:Derwent WPIX

013446924
WPI Acc No: 2000-618867/200059
XRAM Acc No: C00-185372
XRPX Acc No: N00-458642
Composite golf club head manufacture using by coating fiber array with metal and hot pressing or squeeze casting
Patent Assignee: MATERIALS & ELECTROCHEMICAL RES CORP (MATE-N)
Inventor: KELLY W B; **LOUTFY R O**; NEWELL K J; PICKARD S M; **WITHERS J C**
Number of Countries: 0?? Number of Patents: 003
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 200054852	A1	20000921	WO 2000US6658	A	20000314	200059	B
EP 1165191	A1	20020102	EP 2000916327	A	20000314	200209	
			WO 2000US6658	A	20000314		
JP 2002538906	W	20021119	JP 2000604923	A	20000314	200281	
			WO 2000US6658	A	20000314		

Priority Applications (No Type Date): US 99268251 A 19990315
Patent Details:
Patent No Kind Lan Pg Main IPC Filing Notes
WO 200054852 A1 E 65 A63B-053/04
Designated States (National): CA JP
Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
EP 1165191 A1 E A63B-053/04 Based on patent WO 200054852
Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
JP 2002538906 W 100 A63B-053/04 Based on patent WO 200054852

Abstract (Basic): WO 200054852 A1
Abstract (Basic):

NOVELTY - Manufacturing golf club structure involves coating aluminum over a ceramic fiber array (142). The composite material is hot pressed in a mold and holding temperature during pressing at minimum of 400 degrees C to form diffusion bond between fiber and matrix. Ceramic fiber content in the composite is 20-80% by weight.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for manufacturing processes for the golf club structure:

1) A relatively porous preform is placed in a squeeze casting die and the matrix metal is superheated and introduced into the mold under sufficient pressure to penetrate the preform and rapidly solidify.

2) A quantity of tungsten powder is pressed in a die mold to form a preform for the club structure. The preform is placed in a selected region of the mold (141) with a quantity less dense of ceramic powder. Squeeze casting with the molten metal (143) produces a golf club which is selectively weighted determined by the positioning of the tungsten component in the mold.

3) Using centrifugal casting to cause ceramic particles to migrate to the edges of the club head. Highest concentration of ceramic material is designed to be at the face and sole of the head.

4) The fiber array is impregnated with a phenolic resin containing silicon powder particles and is heat treated for hardening. The club

head is removed from the mold and pyrolized.

5) A laminate structure is assembled, consisting of alternate layers of hard and soft material. The ends of the layers are presented as strips on the head face. The layers are bonded by diffusion bonding.

6) The golf club head can be coated with fullerenes. The titanium club head reacts with the **fullerene** to form an adherent coating of **fullerene** titanium carbide.

USE - Golf club head.

ADVANTAGE - Strength and hardness can be improved and club heads can be selectively weighted in different regions to provide performance advantages.

DESCRIPTION OF DRAWING(S) - The figure shows the squeeze casting process.

Die mold (141)

Fiber array (142)

Superheated molten aluminum (143)

pp; 65 DwgNo 8/9

11/3,AB/13 (Item 3 from file: 350)
DIALOG(R)File 350:Derwent WPIX

010049569
WPI Acc No: 1994-317280/199439
XRAM Acc No: C94-144604
XRPX Acc No: N94-249096
Electrochemical hydrogenation of **fullerene**(s) with improved yields - using conductive **fullerene** electrode useful in batteries and hydrogen-air fuel cells
Patent Assignee: MATERIALS & ELECTROCHEMICAL RES CORP (MATE-N)
Inventor: **LOUTFY R O; WITHERS J C**
Number of Countries: 021 Number of Patents: 007
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 9422176	A1	19940929	WO 94US1646	A	19940214	199439	B
AU 9461385	A	19941011	AU 9461385	A	19940214	199504	
US 5470680	A	19951128	US 9334354	A	19930319	199602	
EP 691037	A1	19960110	EP 94908351	A	19940214	199607	
			WO 94US1646	A	19940214		
EP 691037	A4	19960424	EP 94908351	A		199643	
JP 8507830	W	19960820	JP 94521126	A	19940214	199702	
			WO 94US1646	A	19940214		
JP 3404044	B2	20030506	JP 94521126	A	19940214	200330	
			WO 94US1646	A	19940214		

Priority Applications (No Type Date): US 9334354 A 19930319
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 9422176	A1	E	32	H01M-004/58	
					Designated States (National): AU CA JP KR
					Designated States (Regional): AT BE CH DE DK ES FR GB GR IE IT LU MC NL PT SE
AU 9461385	A			H01M-004/58	Based on patent WO 9422176
US 5470680	A		15	H01M-004/58	
EP 691037	A1	E		H01M-004/58	Based on patent WO 9422176
					Designated States (Regional): DE FR GB IT
EP 691037	A4			H01M-004/58	
JP 8507830	W		30	C25B-003/04	Based on patent WO 9422176
JP 3404044	B2		10	C25B-003/04	Previous Publ. patent JP 8507830
					Based on patent WO 9422176

Abstract (Basic): WO 9422176 A
Electrochemical prodn. of CnHx (where n = even number of 20 or above; and x = from m (to n) is by hydrogenation of Cn (esp. a **fullerene** with n = 60) by applying electric current across a pair of electrodes (103,104) in contact with a proton donor electrolyte (102), with one of the electrodes (103) being of Cn in contact with a conductive material.
The electrode (103) mixt. pref. takes the form of a **fullerene** deposited on a metal (esp. Ag) substrate or of a mixt. of powdered **fullerene** with powdered conductive material (esp. carbon amounting to 10-60 vol.%). Electrolyte (102) is an aq. KOH soln. and the other electrode is an air electrode or is of Ni hydroxide.
ADVANTAGE - Hydrogenation of **fullerene** is safer and less complex than Birch redn. and gives better yields than prior-art

catalytic methods, while providing a fuel cell or battery for storing hydrogen and electrical energy.

Dwg. [illegible]

Abstract (Equivalent): US 5470680 A

A method for the electrochemical production of CnHx (where n= [illegible], x [illegible]- n) comprises the hydrogenation of Cn by applying a source of electric current across a pair of electrodes of an electrochemical cell. Where the electrodes are in contact with an effective proton donor electrolyte, wherein one of the electrodes comprises Cn in contact with a conductive material to which electric current is applied.

Dwg. [illegible]

[illegible],AN 14 Item 4 from file: 350

DIALOG(R)File 350:Derwent WPIX

[illegible]

WPI Acc No: 1994-[illegible]3029/199410

XRAM Acc No: C94-[illegible]37993

Prodn. of **fullerene**(s) - by evaporating fluid carbon, and collecting quenched carbon prod contg **fullerene**(s)

Patent Assignee: MATERIALS & ELECTROCHEMICAL RES CORP (MATE-N)

Inventor: **LOUTFY R O; WITHERS J C**

Number of Countries: 030 Number of Patents: 007

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 9404461	A1	19940303	WO 93US7654	A	19930812	199410	B
AU 9350113	A	19940315	AU 9350113	A	19930812	199428	
EP 656870	A1	19950614	EP 93920057	A	19930812	199528	
			WO 93US7654	A	19930812		
JP 8500079	W	19960109	WO 93US7654	A	19930812	199642	
			JP 94506443	A	19930812		
AU 678398	B	19970529	AU 9350113	A	19930812	199730	
EP 656870	A4	19970716	EP 93920057	A	19930812	199813	
US 5876684	A	19990302	US 92930818	A	19920814	199916	

Priority Applications (No Type Date): US 92930818 A 19920814

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 9404461	A1	E	85	C01B-031/00	
Designated States (National): AT AU CA CH CZ DK FI GB [illegible] KR [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] PT SE SK UA					
Designated States (Regional): AT BE CH DE DK ES FR GB GR IE IT [illegible] MC NL PT SE					
AU 9350113	A			C01B-031/00	Based on patent WO 9404461
EP 656870	A1	E		C01B-031/00	Based on patent WO 9404461
Designated States (Regional): AT CH DE FR GB IT LI NL					
JP 8500079	W		56	C01B-031/02	Based on patent WO 9404461
AU 678398	B			C01B-031/00	Previous Publ. patent AU 9350113
					Based on patent WO 9404461
EP 656870	A4			C01B-031/00	
US 5876684	A			C01B-031/02	

Abstract (Basic): WO 9404461 A

Fullerenes are produced by: (a) evaporating a fluid form of carbon (I) in a non-oxidising environment that contains a quenching medium (II) for condensing the evaporated carbon, and (b) collecting the quenched carbon prod. (III) contg. at least one **fullerene**.

(I) is esp. particulate carbon, pref. fed continuously; it may be in form of a fixed or fluidised bed. Alternatively, (I) may be a gaseous, liq. or solid hydrocarbon, e.g. acetylene, toluene, naphthalene or natural gas.

ADVANTAGE - Huffmen, Kratschmer, etc. al, Nature 347, p 354, 1990, have disclosed a process for synthesising C60 and C70 fullerenes in which vaporised carbon is produced from graphite rods; there is however difficulty in scaling up this process. Such difficulty is overcome by the present process, in which the carbon to be vaporised is fed in a form that can be poured as a stream of particles or fed as a fluid.

Dwg.16/18